

- A. Title:** Application for Permit for Scientific Purposes under the Endangered Species Act of 1973

Project Name: Icicle Creek 10-Year Research Program

- B. Species:** Upper Columbia River Steelhead (fry/parr life stage), Upper Columbia River Chinook (fry/parr life stage)

C. Date of Permit Application: 11-05-06

D. Applicant Identity

1. Micah Wait, Conservation Biologist
2. Washington Trout
3. PO Box 402 Duvall, Wa 98019
4. Tel: (425)788-1167 Fax: (425)788-9634 email: micah@washingtontrout.org

E. Information on Personnel, Cooperators, and Sponsors

1. **Principle Investigators:** Eliot Drucker, Nick Gayeski, Jamie Glasgow, Micah Wait. (see above for contact), Dr. Brian Kennedy, Dr. Gary Winans
2. **Field Supervisors:** Brent Trim, Mary Lou White, John Crandall. Phone number is same as for the P.I.s (Résumés attached)
3. **Field Personnel:** Dave Crabb, Frank Staller
4. **Funding Source:** The Icicle Fund
5. N/A
6. N/A
7. N/A

F. Project Description, Purpose, and Significance

1. We propose an intensive multi-year research program in Icicle Creek Chiwaukum Creek and the Chiwawa River whose primary goal is to improve our understanding of (1) the relationships among physical and ecological processes governing aquatic food webs; (2) habitat use, growth, and survival of juvenile salmonids; and (3) population structure and dynamics of resident salmonids reintroduced to the influence of anadromy. Collecting this fundamental information will address a lack of critically important knowledge about the ecology of native resident and migratory salmonids in the upper Columbia basin, and will support science-based policy and management decisions in the basin. The proposed work will contribute to the body of primary research on salmonid life history and ecosystem recovery. We believe that the results will be significant for managers of fishery resources and policy-makers concerned with recovery of listed salmonids.
2. This project does not respond directly to a recommendation or requirement of a federal agency.

3. To study the processes of ecological recovery and recolonization in Icicle Creek, we will conduct field research activities and associated data analyses at intervals over a ten year period (2007–2016). Such long-term monitoring has been shown to be required for detecting ecological responses to the reconnection of isolated habitat (Roni 2005). Following an established study design of our partners (Ward 2005), we will perform intensive monitoring in the first three years of the study (2007–2009), and thereafter continue the comprehensive fieldwork at three-year intervals (2012 and 2015). During interim years we will perform selected study elements. Analysis and reporting for each work element will be performed each year, with a final synthetic analysis to be conducted in 2016.
4. To ensure that the proposed study complements the efforts of existing monitoring activities in the Wenatchee River watershed, WT has coordinated with biologists in the Integrated Status and Effectiveness Monitoring Program (ISEMP), headed by Dr. Chris Jordan (NOAA, Northwest Fisheries Science Center). At the November 2005 meeting of ISEMP's Upper Columbia Regional Technical Team, WT was invited to introduce its Icicle Creek research proposal and received enthusiastic support for its implementation. In defining research objectives for Icicle Creek, WT has interacted with numerous state and federal agencies (including the Washington Department of Fish and Wildlife, Washington Department of Ecology, US Fish and Wildlife Service, and US Forest Service) whose staff are currently monitoring a subsample of fish populations in the Wenatchee subbasin under ISEMP contract. The mutually beneficial working relationships established with these biologists will support successful completion of the proposed work both in the Icicle Creek and Chiwaukum Creek subbasins.

Dr. Brian Kennedy, a faculty member in the College of Natural Resources at the University of Idaho, has pioneered the geochemical techniques involved in this study (see Appendix C) and will be a critical collaborator on the project. Dr. Gary Winans of NOAA Fisheries will direct both the genetics sampling and analyses, and the *in situ* photography and morphometrics analyses. Washington Trout's juvenile fish sampling, PIT tagging, snorkel and spawning surveys, and benthic invertebrate sampling will be conducted with the technical assistance of George Pess (NOAA Fisheries), Judy De La Vergne (USFWS) and the following ISEMP affiliates: Dr. Chris Jordan (NOAA Fisheries), Mike Ward (Terraqua, Inc.), Tracy Hillman (BioAnalysts, Inc.), Jackie Haskins (USFS), Andrew Murdoch (WDFW), Glenn Merritt (WDOE), and Chuck Pevin (Chelan County PUD).

5. In order to understand how populations of *Oncorhynchus mykiss* will respond to the reconnection of historical habitat it will be necessary to use this species in our research. The population in the Chiwaukum basin, and potentially the Chiwawa River where anadromy has been continuous, will serve as a reference population to the Icicle Creek population.

G. Project Methodology

1. **Start Date:** June 1, 2007; **End Date:** December 31, 2016
2. **Procedures and Techniques**
 - a. **Capture:** Individuals will be captured using a variety of methods including minnow trapping, electrofishing, seining, and angling. Minnow traps will be baited with artificial scented baits (e.g. Power Bait) or with salmon roe. If artificial baits prove effective in capturing juvenile rainbow/steelhead this bait will be used exclusively, otherwise preserved salmon roe will be used. All salmon roe used will be from a disease-free source approved by Dr. Ray Brunson, US Fish and Wildlife Service, Fish Health Center, Lacey, Washington. Most of the captured rainbow trout will be anesthetized, pit tagged, fin clipped, and then released. Subsamples of no more than 20 individuals of individuals captured on each sampling occasion (no more than 5 individuals in each of 4 size classes: 70 - 100 mm fork length (FL) , 101 - 150 mm FL, 151 - 200 mm FL, >200 mm FL) will also be sampled for stomach contents using gastric lavage and then released. Capture of juvenile chinook salmon will be incidental, and all individuals will be immediately released. **Release:** Individuals will be released to the capture site.
 - b. Sampling will be conducted in the summer, fall, and winter at numerous locations in the Icicle Creek and Chiwaukum Creek watersheds.
 - c. Fish will be injected with PIT tags using the protocols from the PIT Tag Marking Procedures Manual developed by the Columbia Basin Fish and Wildlife Authority.
 - d. Fish will be anesthetized using MS-22 at the recommended dosage level of 50mg/L (50ppm).
 - e. All rainbow trout brought to hand will be enumerated, identified to species, marked with a PIT tag, fin clipped for genetic analysis, measured for fork length, and weighed. Once they are captured fish will be temporarily held at low densities at ambient stream temperature in a flow-through 5 gallon buckets weighted with stream substrate and securely placed in the stream. They will then be transferred to the anesthetic treatment before processing, and will be placed in a flow-through 5-gallon recovery bucket following processing and prior to their release at the point of capture. Approximately 5% of the fish will be

transferred to a flow through aquarium (photarium) where they will be photographed prior to anesthetization.

- f. See section G (2) e –above.
3. It is not anticipated that we will need to change our protocols, however if circumstances arise that force us to change we will always use caution when handling listed species and will take every precaution to ensure their safe return the stream
4. The potential for injury to fish is fairly high given the intrusive sampling we will be conducting. However WT has a well trained staff with a high degree of experience in fish handling and the desire to see all of our sampled fish returned to the stream with as little harm as possible. To ensure this we will annually hold a fish handling demonstration seminar in the field for all of our staff to ensure that standardized fish handling techniques are always applied. Particularly, there is a high potential for injury to fish in the PIT tag injection process and the stomach content lavages. These techniques will be annually practiced at the beginning of each field season in areas with non-listed fish prior to sampling in areas with listed fish.

H. Description and Estimation of Take

1. The Columbia Rive DART (Data Access in Real Time) shows a return of 1183 wild origin Upper Columbia Spring Run Chinook to McNary Dam in 2006. Of these 451 were fish that originated in the Chiwawa basin, and 112 were Wenatchee River mainstem fish, the population we are most likely to encounter in Icicle Creek in the vicinity of LNFH and in Chiwaukum Creek. This data can be viewed at: (<http://www.cbr.washington.edu/dart/esu/esuytd.ch1uc>).

The Columbia Rive DART (Data Access in Real Time) shows a return of 587 wild origin Upper Columbia Steelhead to McNary Dam in 2006. Of these 6 were fish that originated in the Chiwawa basin, and 10 were Wenatchee River mainstem fish, the population we are most likely to encounter in Icicle Creek in the vicinity of LNFH and in Chiwaukum Creek. This data can be viewed at: (<http://www.cbr.washington.edu/dart/esu/esuytd.stc>).

Estimates for the Chiwawa Basin made from snorkel surveys in 2003, 2004, and 2005 were 90,000, 45,000, and 50,000 age 0 chinook, respectively. Over the same period 17,000, 10,000 and 12,000 age 0 steelhead were estimated to be in the basin (Hillman and Miller 2006).

2. Mortality rates for the PIT Tag procedure rates were made by estimating that 5% of the approximately 200 fish that we process will die unintentionally. No fish will be killed intentionally. Mortality rates for juvenile chinook were made by

estimating that 1% of the approximately 100 fish that we handle will die unintentionally. No fish will be killed intentionally.

3. Mortality rates for the PIT Tag procedure were based off of mortality rates cited in Bateman and Gresswell (2006 NAJFM). In their study Bateman and Gresswell implanted PIT tags in age 0+ steelhead with a 14% mortality rate. We estimate a 5% mortality rate to be the upper limit of mortality for our method given that PIT tag mortality is generally negatively correlated with size and we will primarily be tagging age 1+ fish. Estimates of incidental mortality for Upper Columbia River spring Chinook were made based on Washington Trout's extensive experience in the handling of juvenile salmonids and are considered to be the uppermost limit of mortality. In 2 years of sampling in marine environments (where fish are more sensitive to low oxygen and high temperatures) WT had an observed incidental mortality of 0.4% for ~1500 handled ESA listed fish.

4. It is anticipated that a USFWS listed species, Bull Trout, will be affected by our actions. These fish are listed as a part of the Columbia River Klamath River DPS, we will be taking them under the authority of a USFWS scientific collection permit that we are applying for concurrently.

I. Transportation and Handling

1. No fish will transported in the execution of this project

J. Cooperative Breeding Program

1. Washington Trout would be willing to participate in a cooperative breeding program and to maintain or contribute data to a breeding program, if such action is requested.

K. Previous or Concurrent Activities Involving Listed Species

1. Washington Trout has previously held a 10(a)(1)(a) permit for the take of Puget Sound Chinook Salmon and Hood Canal Summer Run Chum Salmon. The permit number is 1513. Washington Trout worked with Gary Rule for the permit application and reporting.
2. Over the course of the 2 year West Whidbey Fish Use Assessment we had 5 mortality events resulting in the death of 7 fish. All fish were Puget Sound chinook in the smolt life stage captured on the Admiralty Inlet shoreline of Whidbey Island and the river (population) of origin was unknown (based on CWT results for other captured chinook they were likely Whidbey basin fish from the Samish, Skagit, Stillaguamish, or Snohomish River basins). Of the ~1500 fish captured this gives

an incidental mortality rate of 0.4%. All mortality events were the result of either fish jumping out of holding buckets, or fish jumping out of the technician's hands as they were being transferred from holding buckets to measuring boards or the weighing scale. In order to prevent fish from jumping out of buckets material was laid over buckets and buckets were not filled as high with sea water.

Annual Estimation of Take Table for Icicle Creek

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Columbia Steelhead	Juvenile	Wild	Capture, handle, PIT tag, tissue sample, release	200	10	The Icicle Creek historical channel adjacent to the LNFH	June 2007- September 2009
Upper Columbia <i>Spring Run</i> Chinook	Juvenile	Wild and Hatchery	Capture, release	100	1	The Icicle Creek historical channel adjacent to the LNFH	June 2007- September 2009

Annual Estimation of Take for Chiwaukum Creek

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Columbia Steelhead	Juvenile	Wild	Capture, handle, PIT tag, tissue sample, release	500	25	Chiwaukum Creek from the Wenatchee River to RM 6.0	June 2007- September 2009
Upper Columbia <i>Spring Run</i> Chinook	Juvenile	Wild and Hatchery	Capture, release	50	2	Chiwaukum Creek from the Wenatchee River to RM 6.0	June 2007- September 2009

Annual Estimation of Take for the Chiwawa River

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Columbia Steelhead	Juvenile	Wild	Capture, handle, PIT tag, tissue sample, release	500	25	Chiwawa River from the Wenatchee River to Alder Creek	June 2007- September 2009

Upper Columbia <i>Spring Run</i> Chinook	Juvenile	Wild and Hatchery	Capture, release	25	0	Chiwawa River from the Wenatchee River to Alder Creek	June 2007- September 2009
---	----------	----------------------	---------------------	----	---	---	------------------------------------

- L. **Certification:** You must include the following paragraph, exactly as worded, followed by the applicant or responsible party's signature, name, position title, and date:

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA."

Signature

Date
1-15-07

Micah Wait Conservation Biologist
Name and Position Title (print)

Attach résumés here or submit it/them as a separate document.